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Paul D. Stultz

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Roger Fulghum
Baker Botts L.L.P.
One Shell Plaza
910 Louisiana Street
Houston, TX 77002-4995

EXAMINER

DALEY, CHRISTOPHER ANTHONY

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/706,419	Applicant(s) STULTZ, PAUL D.	
	Examiner CHRISTOPHER A. DALEY	Art Unit 2111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-18,20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-3, 5-18, 20 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 – 3, 5-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodman et al (US6282601) hereinafter Goodman in view of Kim (US6938253).

4. As to claim 1, Goodman discloses an information handling system, comprising: a plurality of processors coupled to a processor bus (Goodman teaches in figure 1 of a plurality of processors 12a, 12b ... 12n, COL. 3, Lines 1 - 10)., and a memory (a system memory 16 in figure 1, COL. 3, Lines 1 - 10).

Goodman does not explicitly teach wherein each of the processors is operable to enter an interrupt mode and wherein a uniquely addressable semaphore in memory is associated with each processor and indicates whether the associated processor has exited the interrupt mode.

However, Kim teaches wherein each of the processors is operable to enter an interrupt mode and wherein a uniquely addressable semaphore in memory is associated with each processor and indicates whether the associated processor has

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exited the interrupt mode. Kim teaches in figure 2 of a multiple processor system with processors such as 12 and 14. Said processors are coupled to a semaphore manager 22 which comprises mailboxes, 70A, and 70B uniquely associated with said processors, COL. 6, lines 1 – 15.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the semaphore system of Kim in the computer system of Goodman to have a means of managing the multiple interrupts in a multi-processor system, COL. 2, lines 32 – 43.

One of ordinary skill in the art would have been motivated to use the semaphore system of Kim in the computer system of Goodman to have a means of managing the multiple interrupts in a multi-processor system, COL. 2, lines 32 – 43.);

Kim teaches each of the semaphores is stored in a memory location that is offset from a base memory location by a unique offset indicator (the semaphores are stored in control register as illustrated in Figure 2 with said offset, COL. 6, lines 35 - 43).

Kim discloses wherein each processor is operable to access the semaphores associated with the processors of the information handling system on a non-exclusive basis (Multiple processors with multiple semaphore being simultaneously transacted, COL. 6, lines 16 - 29).

5. As to claim 2, Kim discloses the information handling system, wherein

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each of the semaphores is stored in a memory location that is offset from a base memory location by a unique offset indicator (The semaphores are stored in control register as illustrated in Figure 2 with said offset, COL. 6, lines 30 – 43).

6. As to claim 3, Kim discloses the information handling system, wherein each processor is operable to access the semaphores associated with the processors of the information handling system (Figure 3 illustrates each processor with an assigned mailbox, 70A, and 70B, COL. 6, lines 16 – 30).

7. As to claim 5, Goodman discloses the information handling system, wherein the memory location associated with the storage of the semaphores associated with the processors of the information handling system is memory space dedicated to storing data associated with the entry of the processors into interrupt mode (Said memory space allocation for interrupt sequences, such as power-on self test, COL. 4, lines 10 – 18).

8. As to claim 6, Goodman discloses the information handling system, wherein the the interrupt mode is system management interrupt mode (said mode, COL. 3, lines 42 – 45).

9. As to claim 7, Goodman discloses the information handling system, wherein the interrupt mode is a system management interrupt mode (said mode, COL. 3, lines 42 –

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45); Wherein the semaphore associated the semaphore associated with a processor is stored in a memory location that is offset from a base memory location by a unique offset indicator associated with said processor (Figure 1 illustrates control register 106 in each processor that has a unique offset, page 1, paragraph 0016); and wherein each processor is operable to access the semaphores associated with the processors of the information handling system on a non-exclusive basis (Each processor has said access via the CAU unit. That arbitrates all semaphore requests, page 1, and paragraph 0016).

10. As to claim 8, Goodman discloses a method for processing an interrupt in a multiple processor computer system, comprising the steps of: for each processor, entering interrupt mode (each processor enters the interrupt mode from the assertion of an SMI interrupt to all processors, COL. 4, Lines 54 - 56)., Kim teaches for each processor, setting a semaphore associated with the processor to indicate that the processor has exited the interrupt mode, wherein a uniquely addressable semaphore in a memory of the computer system is associated with each processor (Figure 3 illustrates said process COL. 6, lines 43 - 53); and teaches for each non-interrupt handling processors, exiting interrupt mode up following the negation of the semaphore associated with the processor (Figure 3 illustrates how the exit phase is accomplished by the processor by appropriate bit setting, COL. 6, lines 54 - 65).

Kim discloses wherein each processor is operable to access the semaphores associated with the processors of the information handling system on a non-exclusive

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basis (Figure 2 illustrates a system comprising of a processor with an associated unique coprocessor to interface with the semaphore manager that has a unique mailbox for each processor, COL. 6, lines 16 – 30).

11. As to claim 9, Kim discloses the method for processing an interrupt in a multiple processor computer system, wherein the step of setting a semaphore for each processor comprises the step of setting the semaphore for each processor on a non-exclusive basis (Figure 2 illustrates said method, COL. 6, lines 35 - 43).

12. As to claim 10, Kim discloses the method for processing an interrupt in a multiple processor computer system, wherein the step of negating the semaphores of the non-interrupt handling processors of the computer system comprises the step of negating the semaphores of the non-interrupt handling processors of the computer system on a non-exclusive basis (Figure 2, lines 16 - 30).

13. As to claim 11, Goodman discloses the method for processing an interrupt in a multiple processor computer system, wherein the interrupt is a system management interrupt (the interrupt mode is said mode, COL. 3, lines 42 - 45).

14. As to claim 12, Kim discloses the method for processing an interrupt in a multiple processor computer system, wherein each of the semaphores are stored in a memory location that is offset from a base memory location by a unique

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offset indicator (Figure 3 illustrates content of storage device , page 2, paragraph 0018).

15. As to claim 13, Kim discloses the method for processing an interrupt in a multiple processor computer system, wherein the step of setting a semaphore for each processor comprises the step of setting the semaphore for each processor on a non-exclusive basis (Figure 2 , with unique mailbox for each processor Col. 6, lines 16 - 30);

wherein the step of negating the semaphores of the non-interrupt handling processors of the computer system comprises the step of negating the semaphores of the non-interrupt handling processors of the computer system on a non-exclusive basis (Figure 2, COL. 6, lines 16 - 43); and

wherein each of the semaphores are stored in a memory location that is offset from a base memory location by a unique offset indicator (Figure 2 with memory offsets described at COL. 6, lines 35 - 43).

16. As to claim 14, Goodman discloses the method for processing an interrupt in a multiple processor computer system, wherein the interrupt is a system management interrupt (Goodman teaches of the interrupt mode is said mode, COL. 3, lines 42 - 45),

Kim teaches wherein the step of setting a semaphore for each processor comprises the step of setting the semaphore for each processor on a non-exclusive basis; wherein the step of negating the semaphores of the non-interrupt handling

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processors of the computer system comprises the step of negating the semaphores of the non-interrupt handling processors of the computer system on a non-exclusive basis (Figure 2 illustrates the manipulation of semaphore for each processors COL. 6, lines 16 - 53).

17. As to claim 15, Goodman discloses a computer system, comprising'. a plurality of processors, a memory (figure 1 of a plurality of processors 12a, 12b ... 12n, COL. 3, lines 1 - 10);

a memory (a system memory 16 in figure 1, COL. 3, lines 1 - 10),.

wherein the architecture of the processors and the memory is a non-uniform memory access architecture (the support other multiple computer systems comprising numa architecture machines, COL. 2, lines 55 - 67); and

Kim teaches wherein each of the processors is operable to enter an interrupt mode and wherein a uniquely addressable semaphore in memory is associated with each processor and indicates whether the associated processor has exited the interrupt Mode (Kim teaches in figure 2 of a multiple processor system with processors such as 12 and 14. Said processors are coupled to a semaphore manager 22 which comprises mailboxes, 70A, and 70B uniquely associated with said processors, COL. 6, lines 1 – 15).

Kim discloses wherein each processor is operable to access the semaphores associated with the processors of the information handling system on a non-exclusive basis (Figure 2 illustrates said method, COL. 6, lines 16 - 32).

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18. As to claim 16, Goodman discloses the computer system, wherein the interrupt mode is associated with a system management interrupt (the interrupt mode is said mode, COL. 3, lines 42 - 45).

19. As to claim 17, Kim discloses the computer system, wherein each of the semaphores is stored in a memory location that is offset from a base memory location by a unique offset indicator (The semaphores are stored in control register as illustrated in Figure 2 with said offset, COL. 6, lines 30 – 43).

20. As to claim 18, Goodman discloses the computer system, wherein the memory location associated with the storage of the semaphores is memory space dedicated to storing data associated with the entry of the processors into interrupt mode (said memory space allocation for interrupt sequences, such as power-on self test, COL. 4, lines 10 - 18).

21. As to claim 19, Kim discloses the computer system, wherein the semaphores may be accessed by each of the processors on a non-exclusive basis (figure 2 illustrates said multiple semaphore transaction, page 1, paragraph 0008).

22. As to claim 20, Kim discloses the computer system, wherein each of the semaphores is stored in a memory location that is offset from a base memory location

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by a unique offset indicator (The semaphores are stored in control register as illustrated in Figure 2 with said offset, COL. 6, lines 30 – 43).

Response to Arguments

23. Applicant's arguments with respect to claims 1,8, and 15 have been considered but are moot in view of the new ground(s) of rejection. The Applicant has argued that Heddes also discusses that the semaphores are assigned to a thread of a multiprocessing unit. (Heddes at ¶ [0009].) (emphasis added) Clearly the semaphores of Heddes are not associated with a processor but rather are associated with a thread. Also, while Heddes discusses storage of semaphores, Heddes does not discuss "a uniquely addressable semaphore in memory is associated with each processor" so as to indicate "whether the associated processor has exited the interrupt mode" as required by the independent claims. The Examiner points to semaphore value storage 21 as disclosing this limitation. (Office Action at 2-3.) Yet, the semaphore value storage 21 is designed to have two registers with the first register holding the semaphore value "that can be locked by the associated thread" and the second register indicated whether the associated semaphore value is locked or unlocked. (Heddes at ¶ [0018].) Heddes also discusses that "each thread has more than one assigned register in the semaphore value storage and is thus identified as the source of the semaphore value requested." (Heddes ¶ [0019].) The value of the semaphore in Heddes does not indicate whether the associated process has exited the interrupt mode but rather indicates the bit value

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which the thread wishes to lock. (Heddes at ¶ [0019].) For at least these reasons, Heddes does not disclose the above referenced limitations.

In response, the examiner points to the following teaching of Kim.

Kim teaches for each processor, setting a semaphore associated with the processor to indicate that the processor has exited the interrupt mode, wherein a uniquely addressable semaphore in a memory of the computer system is associated with each processor (Figure 3 illustrates said process COL. 6, lines 43 - 53); and teaches for each non-interrupt handling processors, exiting interrupt mode up following the negation of the semaphore associated with the processor (Figure 3 illustrates how the exit phase is accomplished by the processor by appropriate bit setting, COL. 6, lines 54 - 65).

Kim discloses wherein each processor is operable to access the semaphores associated with the processors of the information handling system on a non-exclusive basis (Figure 2 illustrates a system comprising of a processor with an associated unique coprocessor to interface with the semaphore manager that has a unique mailbox for each processor, COL. 6, lines 16 – 30). Thus the prior art clearly teaches the feature claimed.

Conclusion

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER A. DALEY whose telephone number is (571)272-3625. The examiner can normally be reached on 9 am. - 4p m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 571 272 3632. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher A Daley/
Examiner, Art Unit 2111

/Khanh Dang/
Primary Examiner, Art Unit 2111